EXECUTIVE SUMMARY

The City of Moses Lake entered into an Agreed Order (NO. 02-TCPER-4648) with the Washington State Department of Ecology (Ecology) to complete a Remedial Investigation/Feasibility Study (RI/FS) for chemical impacts at the City of Moses Lake Maintenance Facility (Site). The Site is located at 819 E Penn Street, Moses Lake, Washington. The Site is a designated Model Toxics Control Act (MTCA), Washington Administrative Code (WAC) 173-340 (Ecology, 2001a) listed site. The RI/FS has been conducted according to the MTCA cleanup regulations, specifically WAC 173-340 (Ecology, 2001a).

The purpose of the RI/FS is to collect, develop and evaluate sufficient information regarding the City of Moses Lake Maintenance Facility to determine the nature and extent of releases of hazardous substances to support the FS and identify a recommended cleanup action alternative under the MTCA cleanup regulation Chapter 173-340 WAC, specifically Sections WAC 173-340-360 through WAC 173-340-390.

The entire Site is situated on a 7.2-acre rectangular city block that is about 900 feet in an east-west direction by 350 feet in a north-south direction. The Site is the location of the City of Moses Lake Maintenance Facility and supports the City's Department of Water and Streets projects. The RI/FS focuses on the three areas of the maintenance facility:

- The East Portion of the Site, near the maintenance shop, which is the location of previous petroleum hydrocarbon soil and groundwater remediation activities associated with UST closures;
- The Central Portion of the Site where oil impacted soils were encountered during a 2002 geotechnical/environmental investigation (Golder, 2002); and
- The West Portion of the maintenance facility, formerly known as the Mansfield parcel that may have been impacted by potential historic releases of petroleum hydrocarbons or other chemicals.

The RI field work was conducted from March 27, 2003 through May 2, 2003, with supplemental investigations conducted on September 26, 2003 and December 9, 2003. During the RI field investigation samples were collected for chemical analysis from a total of 30 GeoProbe borings, four hollow stem auger borings, (which were completed as monitoring wells), two hand auger holes and six test pits. In addition, groundwater samples were collected and analyzed from ten Site monitoring wells and six GeoProbe locations. The information obtained through the RI was used to supplement existing Site information and previous environmental investigations.

The general groundwater flow direction is towards the northwest and follows the general surface topography. Based on aquifer slug testing, the groundwater flow velocity over the Central Portion of the Site is approximately 0.2 feet per day. The nearest down-gradient use of groundwater is approximately 0.4 miles from the Site and is not at risk of being impacted from contaminated Site soils.

The analytical results for soil and groundwater samples collected for the various sample locations during the RI were evaluated to assess the risk posed by the Site to human health and the environment. The assessment was conducted by evaluating the concentration of constituents of potential concern (COPC) with respect to various State and Federal regulatory soil, groundwater or surface water cleanup or quality criteria. Following an analysis of all relevant and applicable

(ARAR) regulations and laws, MTCA Method A and Method B cleanup levels for unrestricted use were selected to assess human health and environmental concerns related to soil issues. MTCA Method A and Method B cleanup levels for potable water were selected to assess human health related to groundwater and surface water potential exposures. To evaluate the risk associated with terrestrial wildlife, a simplified terrestrial ecological evaluation was conducted in accordance with WAC 173-340-7490 through WAC 173-340-7494. Chapter 173-201A 040 WAC surface water criteria and National Water Quality Criteria (EPA, 2002) for surface water were used to assess the potential off-site impacts to aquatic wetland habitat adjacent to the Site. Those constituents detected in soil or groundwater samples that exceed their respective cleanup or quality criteria were identified as constituents of concern (COCs).

The following summarizes the findings of the RI:

- The nature of the soil and groundwater impacts observed on Site above cleanup or quality criteria appear to be related to petroleum hydrocarbons releases.
- Diesel through lube oil range petroleum hydrocarbons are identified as a COCs for soil and groundwater on the East Portion of the Site. Free product was identified in a Site monitoring well (MW-11), the South end of the Maintenance Shop. The impacted soil and groundwater appear to be limited to a relatively small area nearby MW-11.
- Gasoline through lube oil range petroleum hydrocarbons, xylenes, and lead were identified as COCs for soil in the source area in the Central Portion of the Site. No COCs were identified for groundwater in the Central Portion of the Site.
- No COCs were identified for soil or groundwater on the West Portion of the Site.
- The RI data indicate that COCs have not migrated off-site and there is minimal potential for off-site impacts to occur in the future in association with the Site.
- The ecological risk (to wildlife) under the industrial site scenario is minimal, as bird and small mammal use of the area is minimized by the industrial characteristics of the Site, including the compacted nature of the asphalt or compact soil and gravel covering the sub-surface soil, the lack of plant cover in the area, and the general industrial activity of human and vehicle traffic and noise.

The remedial action objectives (RAOs) were identified for the Site. RAOs are essentially site-specific goals based on acceptable exposure levels that are protective of human health and the environment. RAOs combine consideration of applicable or relevant and appropriate requirements (ARARs) and the specific constituents, affected media, and potential exposure pathways of the site.

Considering the information collected in the RI, the potential risk of identified COCs, and potential migration pathways of materials disposed at the site, the remedial action objectives for this site are identified as:

- Reducing the potential for exposure of human or ecological receptors to petroleum products at the Site via direct contact with contaminated soils or exposure to potentially hazardous constituents in groundwater; and
- Reducing the potential for migration of petroleum from soil to groundwater.

Cleanup goals were identified for Site COCs, including gasoline through lube oil petroleum hydrocarbons xylenes and lead for Site soils and diesel through lube oil range petroleum

hydrocarbons for groundwater. Cleanup goals are numeric expressions of RAOs. Cleanup goals are generally established for COCs as the lower of a numeric chemical-specific ARAR or a risk-based cleanup concentration. Cleanup goals are presented as preliminary in the FS because the final remediation goals, or cleanup levels, are set in the Cleanup Action Plan (CAP).

Cleanup goals for remedial action involving soil excavation are set at the appropriate MTCA Method A or Method B concentrations of ecological concern criteria for Site COCs. Similarly the cleanup goals for groundwater at MW-11 will be set as the appropriate MTCA Method A for Site COCs. These cleanup goals are established for the list of analytes found to exceed their respective MTCA Method A or Method B cleanup criteria or terrestrial ecological evaluation concern criteria and are protective by multiple pathways and for multiple hazardous substances according to WAC 173-340-708 (5).

Based on the RAO and cleanup goals, potential remediation technologies that may be used in association with Site remediation were identified. The candidate technologies were screened based on Site characteristics and RI data to obtain a list of technologies feasible for use in assembling remediation alternatives. The remediation technologies retained through the screening process were incorporated into the following remediation alternatives.

Alternative 1: No Action
Alternative 2 Institutional Control and Monitoring
Alternative 3: Capping - Monitoring and Institutional Controls
Alternative 4: Excavation and Off-Site Landfill
Alternative 5: Excavation and On-Site Treatment
Alternative 6: Excavation and Off-Site Treatment

Alternative 1 (No Action) was included as a baseline. A preliminary evaluation was conducted in accordance with WAC 173-340-350(8)(b), which resulted in eliminating Alternative 1 (No Action) and Alternative 2 (Institutional Control and Monitoring) from further evaluation, because neither alternative meets the threshold requirements for this Site under WAC-173-340-360 (2)(a). Using a comparative methodology, Alternatives 3 through 6 were evaluated for protectiveness, permanence, effectiveness over the long-term, management of short term risk, technical and administrative implementability, public concern and determining whether the alternative uses permanent solutions to the maximum extent practicable to determine a comparative net benefit for each alternative. The cost benefit for each alternative was then calculated for the four remaining alternatives. The net benefit and cost benefit were compared for each alternative. Alternative 4 (Excavation and Off-Site Landfill) had the highest degree of both net benefit and cost benefit and is therefore the recommended remediation alternative.

Alternative 4 (Excavation and Off-Site Landfill) would protect human health and the environment by locating, excavating and removing affected soil from the contaminated area for off-site landfill disposal. This alternative would involve excavation to achieve remediation goals and cleanup levels established in the CAP. Removal of COC to the cleanup goals identified would require excavating soil in the Central Portion of the Site and near MW-11. Transporting impacted soils to a landfill would require importing replacement fill materials for backfill. The source of groundwater impacts at MW-11 will be removed by excavation and the groundwater subsequently tested.